

LIX.—*On the Invertebrate Marine Fauna and Fishes of St. Andrews.* By W. C. M'INTOSH.

[Continued from p. 357.]

Class GASTEROPODA.

Order I. CYCLOBRANCHIATA.

Fam. *Chitonidæ*, Guilding.

Genus CHITON, L.

Chiton fascicularis, L. Jeffreys, Brit. Moll. iii. p. 211, v. pl. 55. f. 3.

Abundant under stones between tide-marks. This species, like the limpet, forms considerable cavities in sandstone, so that specimens become almost immersed.

Chiton cinereus, L. *Op. cit.* iii. p. 218, v. pl. 55. f. 2.

Common in deep water, and in the stomachs of the cod, haddock, and flounder.

Chiton marginatus, Pennant. *Op. cit.* iii. p. 221, v. pl. 56. f. 5.

Frequent under stones between tide-marks.

Chiton ruber, Lowe. *Op. cit.* iii. p. 224, v. pl. 56. f. 4.

Occasionally between tide-marks at the East Rocks.

Chiton levis (Pennant), Mont. *Op. cit.* iii. p. 226, v. pl. 56. f. 6.

Under stones at the verge of extreme low water during spring tides. Rare; but the examples are large.

Order II. PECTINIBRANCHIATA.

Fam. 1. *Patellidæ*, Guilding.

Genus 1. PATELLA, Lister.

Patella vulgata, L., and var. *depressa*. *Op. cit.* iii. p. 236, v. pl. 57.

Common everywhere; occasionally eaten. The soft shale and sandstone are extensively pitted by this form.

Genus 2. HELCION, De Montfort.

Helcion pellucidum, L. *Op. cit.* iii. p. 242, v. pl. 58. f. 1 & 2.

Abundant on the blades of the tangles; while var. *levis* occurs in hollows at the bases of the stems.

Genus 3. TECTURA, Cuvier.

Tectura testudinalis, Müller. *Op. cit.* iii. p. 246, v. pl. 58. f. 3.

Common under stones near low-water mark.

Tectura virginea, Müller. *Op. cit.* iii. p. 248, v. pl. 58. f. 4.

Under stones near low-water mark; nearly as common as the foregoing.

Tectura fulva, Müller. *Op. cit.* iii. p. 250, v. pl. 58. f. 5.

A single specimen on the West Sands after a storm.

Fam. 2. FISSURELLIDÆ, Fleming.

Genus 2. EMARGINULA, Lamarck.

Emarginula fissura, L. *Op. cit.* iii. p. 259, v. pl. 59. f. 2.

Not uncommon in deep water; and worn specimens amongst the shell-débris on sands.

Fam. 3. CAPULIDÆ, Fleming.

Genus CAPULUS, De Montfort.

Capulus ungaricus, L. *Op. cit.* iii. p. 269, v. pl. 59. f. 6.

Frequent in deep water, and often brought in by the fishing-boats.

Fam. 7. TROCHIDÆ, D'Orbigny.

Genus 2. TROCHUS, Rondeletius.

Trochus tumidus, Mont. *Op. cit.* iii. p. 307, v. pl. 62. f. 2.

Common on hard ground in the bay, in the stomach of the cod and haddock, and on the West Sands after storms.

Trochus cinerarius, L. *Op. cit.* iii. p. 309, v. pl. 62. f. 3.

In great abundance on stones and rocks between and beyond tide-marks.

Trochus zizyphinus, L. *Op. cit.* iii. p. 330, v. pl. 63. f. 6.

Not uncommon in deep water and on the beach after storms; rarely met with at extreme low water at the East Rocks. Var. *Lyonsii* is occasionally seen.

Fam. 9. Littorinidæ, Gray.

Genus 1. LACUNA, Turton.

Lacuna crassior, Mont. *Op. cit.* iii. p. 344, v. pl. 64. f. 2.

From tangle-roots and in old shells in the laminarian region, and from deep water; not rare.

Lacuna divaricata, Fab. *Op. cit.* iii. p. 346, v. pl. 64. f. 3.

On Fuci and laminarian blades at and beyond low-water mark. The colourless variety is not uncommon; and the same may be said of var. *quadrifusciata*.

Lacuna puteolus, Turton. *Op. cit.* iii. p. 348, v. pl. 64. f. 4.

With the former at low-water mark; less common than the foregoing.

Lacuna pallidula, Da Costa. *Op. cit.* iii. p. 351,
v. pl. 64. f. 5 & 5a.

On the West Sands after storms, and from the laminarian region.

Genus 2. LITTORINA, Férussac.

Littorina obtusata, L. *Op. cit.* iii. p. 356, v. pl. 65. f. 1 & 1a.

Very common (with varieties) on stones and rocks between tide-marks.

Littorina rudis, Maton. *Op. cit.* iii. p. 364, v. pl. 65.
f. 3, 3a, & 3b.

Abundant on the rocks near high-water mark.

Littorina litorea, L. *Op. cit.* iii. p. 368, v. pl. 65. f. 5 & 5a.

Between tide-marks in vast numbers. Often eaten.

Genus 3. RISSOA, Fréminville.

Rissoa parva, Da Costa. *Op. cit.* iv. p. 23, v. pl. 67. f. 3 & 4.

In great numbers on the seaweeds in the laminarian region all round, especially off the East Rocks. Var. *interrupta* is also common in shell-sand.

Rissoa striata, Adams. *Op. cit.* iv. p. 37, v. pl. 68. f. 2.

Common under stones between tide-marks. The var. *arctica* is the prevailing form.

Rissoa soluta, Philippi. *Op. cit.* iv. p. 45, v. pl. 68. f. 7.

Occasionally in deep water and in shell-sand.

Rissoa semistriata, Mont. *Op. cit.* iv. p. 46, v. pl. 68. f. 8.

From deep water and in shell-sand; not common.

Genus 4. HYDROBIA, Hartmann.

Hydrobia ulvæ, Pennant. *Op. cit.* iv. p. 52, v. pl. 69. f. 1.

In great abundance in the brackish pools near the mouth of the river Eden.

Fam. 11. Skeneidæ, Clark.

Genus 1. SKENEA, Fleming.

Skenea planorbis, Fab. *Op. cit.* iv. p. 65, v. pl. 70. f. 1.

Common in rock-pools amongst *Ceramium* and other algæ.

Genus 2. HOMALOGYRA, Jeffreys.

Homalogyra rota, Forbes & Hanley. *Op. cit.* iv. p. 71,
v. pl. 70. f. 3.

In shell-débris from the West Sands. Dead.

Fam. 13. Turritellidæ, Clark.

Genus TURRITELLA, Lamarck.

Turritella terebra, L. *Op. cit.* iv. p. 80, v. pl. 70. f. 6.

Common in deep water. Var. *nivea* is also not rare. A favourite food of the codfish, probably in many cases on account of its tenant the hermit crab.

Fam. 15. Scalariidæ, Broderip.

Genus SCALARIA, Lamk.

Scalaria Trevelyana, Leach. *Op. cit.* iv. p. 93, v. pl. 71. f. 4.

From the fishing-boats, and on the West Sands after storms. Rather rare.

Fam. 16. Pyramidellidæ, Gray.

Genus 2. ODOSTOMIA, Fleming.

Odostomia rissoïdes, Hanley. *Op. cit.* iv. p. 122, v. pl. 73. f. 4.

Common in shell-sand.

Odostomia clathrata, Jeffreys. *Op. cit.* iv. p. 148, v. pl. 74. f. 9.

Worn specimens not uncommon in shell-débris from the West Sands.

Odostomia indistincta, Montagu. *Op. cit.* iv. p. 149,
v. pl. 75. f. 1.

Occasionally in shell-sand from the West Sands.

Odostomia interstincta, Montagu. *Op. cit.* iv. p. 151,
v. pl. 75. f. 2.

In shell-sand from the same locality.

Odostomia nitidissima, Montagu. *Op. cit.* iv. p. 173,
v. pl. 76. f. 8.

In débris from the West Sands.

Fam. 19. **Eulimidæ**, H. & A. Adams.

Genus EULIMA, Risso.

Eulima bilineata, Alder. *Op. cit.* iv. p. 210, v. pl. 77. f. 8.

In muddy débris on old shells from deep water.

Fam. 20. **Naticidæ**, Swainson.

Genus NATICA, Adanson.

Natica islandica, Gmelin. *Op. cit.* iv. p. 214, v. pl. 78. f. 1.

A single specimen from the fishing-boats.

Natica catena, Da Costa. *Op. cit.* iv. p. 220, v. pl. 78. f. 4.

Common on the sandy bottom off the West Sands. The ova occur abundantly in July and August.

Natica Alderi, Forbes. *Op. cit.* iv. p. 224, v. pl. 78. f. 5.

Less abundant than the foregoing, on the same ground.

Fam. 22. **Velutinidæ**, Gray.

Genus 1. LAMELLARIA, Mont.

Lamellaria perspicua, L. *Op. cit.* iv. p. 235, pl. 3. f. 6,
v. pl. 79. f. 2 & 2 a.

Common under stones between tide-marks, especially in

rock-pools. The figure of the living specimen in Mr. Gwyn Jeffreys's work (iv. pl. 3. f. 6) was copied from a coloured drawing of my sister's. The colours of this species vary in a remarkable manner.

Genus 2. VELUTINA, Fleming.

Velutina lævigata, Pennant. *Op. cit.* iv. p. 240, v. pl. 79. f. 4.

Frequent in the laminarian region, and on the West Sands after storms; occasionally under stones at the verge of low water.

Fam. 23. Cancellariidæ, Forbes & Hanley.

Genus 2. TRICHOTROPIS, Broderip & Sowerby.

Trichotropis borealis, Brod. & Sowerb. *Op. cit.* iv. p. 245, v. pl. 79. f. 6.

A single specimen from the stomach of a cod.

Fam. 24. Aporrhaidæ, Troschel.

Genus APORRHAI, Da Costa.

Aporrhais pes-pelecani, L. *Op. cit.* iv. p. 250, v. pl. 80. f. 1.

Abundant on the West Sands after storms, and frequent in the débris of the fishing-boats.

Fam. 27. Buccinidæ, Fleming.

Genus 1. PURPURA, Bruguière.

Purpura lapillus, L. *Op. cit.* iv. p. 276, v. pl. 82. f. 1.

Very abundant between tide-marks on rocks and stones. Varieties are common.

Genus 2. BUCCINUM, L.

Buccinum undatum, L. *Op. cit.* iv. p. 285, v. pl. 82. f. 2-5.

Common in the living state (var. *littoralis*) in pools at the East Rocks, especially where a stream of salt water rushes through the seaweeds. This species spawns in October, November, and the following months; the young are found in swarms on the egg-cases in May. Frequent on the West Sands after storms.

Genus 5. TROPHON, De Montfort.

Trophon truncatus, Ström. *Op. cit.* iv. p. 319, v. pl. 84. f. 6.

Not uncommon in the fishing-boats, and from the stomachs of the cod, haddock, and flounder.

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Genus 6. FUSUS, Bruguière.

Fusus antiquus, L. *Op. cit.* iv. p. 323, v. pl. 85. f. 1 & 2.

Abundant in the coralline zone, and frequently thrown on shore after storms.

Fusus gracilis, Da Costa. *Op. cit.* iv. p. 335, v. pl. 86. f. 2.

Common on the West Sands after storms, and often brought in by the fishing-boats.

Fusus propinquus, Alder. *Op. cit.* iv. p. 338, v. p. 219,
pl. 86. f. 3.

Occasionally procured from the deep-sea lines of the fishermen.

Fam. 29. Nassidæ, Stimpson.

Genus 1. NASSA, Lamk.

Nassa incrassata, Ström. *Op. cit.* iv. p. 351, v. pl. 88. f. 1.

Common in the laminarian region and under stones between tide-marks; while worn shells are abundant in débris at the East Rocks.

Fam. 30. Pleurotomidæ, Lovén.

Genus 1. DEFRANCIA, Millet.

Defrancia linearis, Mont. *Op. cit.* iv. p. 368, v. pl. 89. f. 2.

From deep water; rather rare.

Genus 2. PLEUROTOMA, Lamk.

Pleurotoma costata, Donovan. *Op. cit.* iv. p. 379, v. pl. 90. f. 3.

Occasionally in shell-débris from the West Sands.

Pleurotoma rufa, Montagu. *Op. cit.* iv. p. 392, v. pl. 91. f. 6.

Common on the West Sands after storms.

Pleurotoma turricula, Montagu. *Op. cit.* iv. p. 395,
v. pl. 91. f. 7.

Abundant under the same circumstances.

Pleurotoma Trevelyana, Turton. *Op. cit.* iv. p. 398,
v. pl. 91. f. 8.

Not uncommon in the stomachs of cod and haddock.

Fam. 31. *Cypræidæ*, Fleming.Genus 2. *CYPRÆA*, L.

Cypræa europæa, Mont. *Op. cit.* iv. p. 403, pl. 7. f. 4,
v. pl. 92. f. 2.

Not uncommon at extreme low water, under stones in pools in the same region at the East Rocks, and generally in the laminarian region. The living animal represented in Mr. Gwyn Jeffreys's work is from a coloured drawing by my sister.

Order IV. *PLEUROBRANCHIATA*, Gray.Fam. 1. *Bullidæ*, Clark.Genus 1. *CYLICHA*, Lovén.

Cylicha cylindracea, Pennant. *Op. cit.* iv. p. 415,
v. pl. 93. f. 4.

Abundant in deep water; generally thrown on the West Sands after storms.

Genus 2. *UTRICULUS*, Brown.

Utriculus truncatulus, Bruguière. *Op. cit.* iv. p. 421,
v. pl. 94. f. 2.

Occasionally from deep water, and in débris on sands.

Utriculus obtusus, Mont. *Op. cit.* iv. p. 423, v. pl. 94. f. 3.

Not uncommon in deep water. A variety with a more extended spire is often met with in shell-débris from the West Sands.

Genus 4. *ACTÆON*, De Montfort.

Actæon tornatilis, L. *Op. cit.* iv. p. 433, v. pl. 95. f. 2.

Frequent off the West Sands, and thrown ashore after storms.

Genus 6. *SCAPHANDER*, De Montfort.

Scaphander lignarius, L. *Op. cit.* iv. p. 443, v. pl. 95. f. 5.

Not uncommon in deep water, and thrown ashore alive after storms.

Genus 7. PHILINE, Ascanius.

Philine scabra, Müller. *Op. cit.* iv. p. 447, v. pl. 96. f. 1.

Abundant in deep water, and in the stomachs of cod, haddock, and flounders. The shells occur on the West Sands after storms.

Philine pruinosa, Clark. *Op. cit.* iv. p. 454, v. pl. 96. f. 6.

From the stomach of a haddock; rare.

Philine aperta, L. *Op. cit.* iv. p. 457, v. pl. 96. f. 8.

Occasionally from deep water; shells thrown on the West Sands after storms.

Fam. 2. Aplysiidæ, D'Orbigny.

Genus APLYSIA, L.

Aplysia punctata, Cuvier. *Op. cit.* v. p. 5, pl. 97. f. 1.

A single specimen was found in autumn amongst the seaweeds of a large pool at extreme low water. No spots or other markings were present on the dull olive hue of the body.

Order V. NUDIBRANCHIATA, Cuvier.

Suborder 1. PELLIBRANCHIATA.

Fam. 1. Limapontiidæ, Alder & Hancock.

Genus 1. LIMAPONTIA, Johnston.

Limapontia nigra, Johnston. *Op. cit.* v. p. 28, pl. 1. f. 5.

Not uncommon amongst the seaweeds under stones in rock-pools.

Suborder II. POLYBRANCHIATA.

Fam. 3. Eolididæ, D'Orbigny.

Genus 2. EOLIS, Cuvier.

Eolis papillosa, L.; Alder & Hancock, Brit. Nud. Moll.
fam. 3, pl. 9.

Abundant in early spring (February) amongst the rocks near low water, and occasionally at other times.

Eolis coronata, Forbes; A. & H. B. Nud. M. fam. 3, pl. 12.

Common in February and the spring months in the same localities.

Eolis rufibranchialis, Johnston; A. & H. B. Nud. M.
fam. 3, pl. 16.

With the foregoing; common.

Eolis olivacea, Alder & Hancock; A. & H. B. Nud. M.
fam. 3, pl. 26.

Not uncommon under stones in pools at all seasons.

Eolis viridis, Forbes; A. & H. B. Nud. M. fam. 3, pl. 32.

Abounds on the small hydroid zoophytes under stones in rock-pools.

Eolis Farrani, Alder & Hancock; A. & H. B. Nud. M.
fam. 3, pl. 35.

Occasionally occurs under stones at low-water mark at the East Rocks. The fine purple variety has been found more than once. A specimen shows the abnormality of a clavate median process between the oral and dorsal tentacles.

Eolis Adelaideæ, Thompson; Jeffreys, Brit. Moll. v. p. 55.

A single specimen was found in a sandy pool in August.

Eolis exigua, Alder & Hancock; A. & H. B. Nud. M.
fam. 3, pl. 37.

Not uncommon on laminarian blades thrown on the West Sands after storms.

Fam. 5. Dotonidæ.

Genus DOTO, Oken.

Doto fragilis, Forbes; A. & H. B. Nud. M. fam. 3, pl. 5.

Occasionally on zoophytes brought in by the fishing-boats.

Doto coronata, Gmelin; A. & H. B. Nud. M. fam. 3, pl. 6.

Common in the débris of the fishing-boats; small specimens are frequently found in groups on *Sertularia pumila* under stones in rock-pools near low-water mark; also on laminarian blades after storms. One example has an abnormal left tentacle.

Fam. 6. *Dendronotidæ*.Genus 1. *DENDRONOTUS*, Alder & Hancock.*Dendronotus arborescens*, Müller; A. & H. B. Nud. M.
fam. 3, pl. 3.

Not uncommon amongst zoophytes from deep water, on laminarian blades thrown on the West Sands, and occasionally at extreme low water. A white variety is sometimes seen.

Fam. 8. *Tritoniidæ*, H. & A. Adams.Genus *TRITONIA*, Cuvier.*Tritonia Hombergi*, Cuv.; A. & H. B. Nud. M. fam. 2, pl. 2.

From deep water. Both pale and deep reddish-brown varieties are found on the zoophytes in the fishing-boats. Occasionally in the stomach of the cod.

Tritonia plebeia, Johnston; A. & H. B. Nud. M. fam. 2, pl. 3.

In vast numbers amongst the zoophytes from deep water, in the crevices of *Alcyonium digitatum* and on *Halecium* tossed ashore after storms. One specimen showed the abnormality of a bifid tail.

Suborder III. *ACANTHOBRANCHIATA*.Fam. 1. *Polyceridæ*.Genus 1. *ÆGIRUS*, Lovén.*Ægirus punctilucens*, D'Orbigny; A. & H. B. Nud. M.
fam. 1, pl. 21.

Not uncommon under stones in rock-pools between tide-marks at the East Rocks.

Genus 2. *TRIOPA*, Johnston.*Triopa claviger*, Müller; A. & H. B. Nud. M. fam. 1, pl. 20.

Fine specimens are occasionally found under stones near low-water mark. The same *Ergasilus* is parasitic on this as on *Doris*.

Genus 5. *POLYCERA*, Cuvier.*Polycera quadrilineata*, Müller; A. & H. B. Nud. M.
fam. 1, pl. 22.

Not uncommon near low-water mark and in the laminarian region.

Polycera ocellata, Alder & Hancock ; A. & H. B. Nud. M. fam. 1, pl. 23.

Gregarious under stones between tide-marks, but not common. They chiefly occur at the West Rocks.

Polycera Lessoni, D'Orbigny ; A. & H. B. Nud. M. fam. 1, pl. 24.

On a laminarian blade after an October storm ; one specimen.

Genus 6. ANCULA, Lovén.

Ancula cristata, Alder ; A. & H. B. Nud. M. fam. 1, pl. 25.

Not rare under stones in rock-pools, chiefly at the East Rocks.

Genus 8. GONIODORIS, Forbes.

Goniodoris nodosa, Mont. ; A. & H. B. Nud. M. fam. 1, pl. 18.

Abundant between tide-marks under stones in rock-pools and elsewhere, throughout the year.

Fam. 2. Dorididæ.

Genus DORIS, L.

Doris tuberculata, Cuvier ; A. & H. B. Nud. M. fam. 1, pl. 3.

Abundant under rocky ledges and under stones in pools. Its parasite, *Ergasilus*, is common.

Doris Johnstonei, Alder & Hancock ; A. & H. B. Nud. M. fam. 1, pl. 5.

Occasionally under stones in pools between tide-marks at the East Rocks. The same *Ergasilus* occurs on this species.

Doris repanda, Alder & Hancock ; A. & H. B. Nud. M. fam. 1, pl. 6.

Abundant at all seasons amongst the rocks between tide-marks.

Doris aspera, Alder & Hancock ; A. & H. B. Nud. M. fam. 1, pl. 9. f. 1-9.

Common under stones in pools near low-water mark.

Doris bilamellata, L. ; A. & H. B. Nud. M. fam. 1, pl. 11.

Abundant between tide-marks at all seasons ; in swarms in March.

Doris pilosa, Müller ; A. & H. B. Nud. M. fam. 1, pl. 15.

Common at all seasons between tide-marks.

Class CEPHALOPODA.

Order DIBRANCHIATA, Owen.

Fam. 1. Teuthidæ, Owen.

Genus 1. OMMATOSTREPHES, D'Orbigny.

Ommatostrephes todarus, Delle Chiaje, Mem. An. s. Vert.
Nap. iv. Mem. ii. tav. 60.

Frequently thrown in numbers on the West Sands, especially after April storms.

Genus 2. LOLIGO, Schneider.

Loligo vulgaris, Lamarck. Jeffreys, Brit. Moll. v. p. 130,
pl. 5. f. 2.

The shells are sometimes found in the stomachs of codfish. The spawn of this species is frequent.

Genus 4. SEPIOLA, Rondelet.

Sepiola Rondeletii, Leach. *Op. cit.* v. p. 136, pl. 6. f. 2.
The sole specimen occurred in the stomach of a flounder.

Fam. 3. Octopidæ, D'Orbigny.

Genus 2. ELEDONE, Leach.

Eledone cirrosa, Lamk. *Op. cit.* v. p. 146, pl. 7. f. 2.

Occasionally in pools between tide-marks, and on the West Sands after storms ; common in the stomachs of cod and haddock.

[To be continued.]